REGISTERED SILVER PRODUCTION IN THE POTOSÍ DISTRICT, 1550–1735

By Peter J. Bakewell

The purpose of this article is modest. It is merely to set out the annual production of silver in the mining district of Potosí between 1550 and 1735. The principal mines of the district were those in the hill (*Cerro Rico*) of Potosí itself; but there were many lesser mining centres in the surrounding areas, of which the most important are shown on Map 1. To determine production was the first object of an investigation into the mining history of Potosí in the sixteenth and seventeenth centuries which the author carried out between 1970 and 1974 [1]. Obviously, in the study of the development of any industrial process, one of the prime points of interest is the end towards which that process is directed: output itself. Knowledge of the Potosí district's production of silver may also be of interest to historians studying other parts of the economy of colonial South America. Up to the eighteenth century the district was the largest producer of silver in the Americas; and indeed in the world. This silver exerted an economic influence at great distances from Potosí, especially on prices and on the direction and volume of trade flows. Historians with an interest in the economic history of both Spanish and Portuguese South America may find positive correlations between certain economic trends in their areas and silver output from Potosí.

A further reason for choosing silver output as the first object of investigation was that the study of production provides a good initial conspectus of Potosí's varying mining fortunes. Information on output can be obtained easily and quickly from the surviving manuscripts; whereas data on, for example, profits, the size of the labour force, or the amount of capital invested – all useful measurements of the progress of mining – are hard to come by. Once having gathered yearly output figures, the researcher knows what long-term trends,

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* Abbreviations (See at the end of the text).

1) I wish to thank the Social Science Research Council (London) and Trinity College, Cambridge, for supporting my research on Potosí, which I could not have undertaken without their help.

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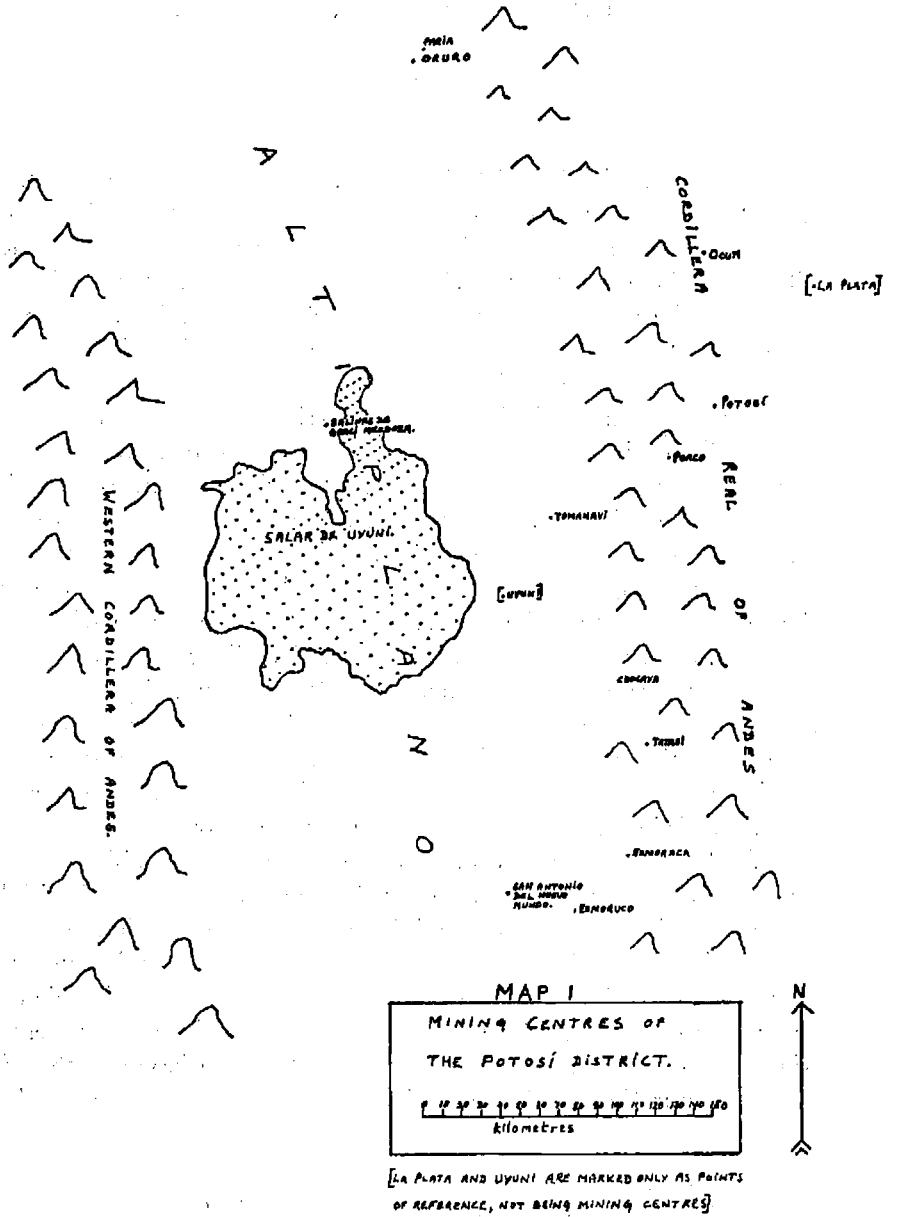

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or short-term excursions from the trend, he must seek to explain. He has an overall pattern in his mind against which to gauge any opinions he may find – for example, in the reports of some administrative body – about variations in production and their causes. For instance, when reading accounts given in the manuscripts of the time of the civil disturbances between the factions known as *vicuñas* and *vascongados* in the early 1620's, the historian of Potosí might find himself led to believe that the disturbances were causing the irretrievable ruin of the silver industry[2]. In fact, the production figures available from the Potosí treasury accounts show that the ructions had no discernible effect on output. Obviously there is a danger that the researcher, knowing from the production figures what the general course of the industry's development was, may tend, consciously or otherwise, to ignore or discard evidence which contradicts the trend. But he should be able to guard against that danger, since its existence is obvious enough. Once production has been established as securely as possible, attention can be turned to the more interesting and less concrete aspects of mining: technology, financial structure, administration, and above all use and conditions of labour. The author is at present preparing a book which will examine these topics discretely, and discuss production as a function of them.

Sources and derivation of production figures

Annual production figures in marks (8 ounces or 226.9 grammes) of silver are shown in Table 1. These figures are derived from the amounts of tax collected by the treasury officials on silver production in the Potosí district. The tax figures are also shown in Table 1, in *pesos ensayados* of 450 *maravedís* – the unit in which they are recorded in the treasury accounts. As will be seen from the Source column of Table 1, nearly all tax figures have been taken from accounts now preserved in the Archivo General de Indias, Seville, and in the archive of the Casa de la Moneda, Potosí.

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2) See, in general, Alberto Crespo Rodas, La guerra entre vicuñas and vascongados, Potosí, 1622–1625, Lima 1956 (2nd. ed. La Paz 1969).

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Archivo General de Indias

The author's research on Potosí began in Seville, and so the Potosí accounts there were examined before those existing in Potosí itself. The Seville archive holds a good series of annual account summaries from Potosí, covering most years between 1550 and 1605. These summaries, the *libros reales comunes del cargo y data* of the *caja real* of Potosí, supplied most of the tax figures shown in Table 1 for the sixteenth century. The tax yields recorded in Table 1 are the annual totals given in the accounts; that is to say, the sum year by year of the bi-weekly or tri-weekly payments of tax made into the Potosí *caja*, as added by the treasury officials and their subordinates. Generally speaking, the officials' ability in addition has been trusted. Spot checks show that it was accurate to a fraction of 1 percent. There were frequent errors in summing *tomines* and *granos*, the subdivisons of the *peso:* but errors of over 100 *pesos* are rare. For a few years (1588, 1590–94, 1601–02, 1604–05) no accounts were found in the Archivo General de Indias. The silver tax figures shown for those years are taken either from correspondence about silver production found in the archive, or from accounts surviving in the Casa de la Moneda of Potosí. Where, as often happened, there were several sources for the silver tax yield in a particular year, the source closest to the original *caja* account was preferred. The figure given in the annual account summary was taken in preference to a figure given in a later account showing tax receipts over several years; but a figure from a source of this second sort was preferred to one given in general correspondence about the amounts of tax gathered. There were, in any case, only small discrepancies between the figures given in different sources. The series of Potosí *caja* accounts held in Seville ceases in 1605, and does not resume until about 1660. Even after then it is not continuous. For much of the seventeenth century it seems likely that copies of the Potosí accounts simply did not reach Spain. Either they were never despatched from the *caja real* in Potosí, which was subjected to many official inspections (*visitas*) in the first half of the century, with consequent great disruption of its administrative routine; or they were retained for audit in the *Tribunal de Cuentas* of Lima, which was created in 1605.

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Casa de la Moneda, Potosí

Tax figures from 1606 onwards have therefore been taken from the archive of the *caja real* of Potosí itself, which survives in remarkably complete form in the Casa de la Moneda. The only year for which this archive failed to yield a figure was 1643. Some figures for the late sixteenth century, as noted above, were also taken from the Potosí archive. Where accounts for the same year survive in both Potosí and Seville, comparison reveals only the slightest differences, such as may be attributed to mistakes in copying or addition, between them. This is to be expected, since the accounts sent to Spain were fair copies of the yearly summaries retained in the *caja* at Potosí. These summaries (the *Libros reales comunes del cargo y data* or the *Libros reales duplicados del común)* were, as in Seville, the category of account most frequently used in research to obtain the yearly silver tax. Where these accounts provided totals of the year's payment of tax, the officials' addition was trusted. But for many years, especially in the period 1639–60, the officials had not added up the yearly total, so that the rather time-consuming task of summing between 80 and 120 tax payments per year had to be undertaken, for many of the years in question. Time did not permit extensive rechecking of this arithmetic, especially since the other 40 or so categories of *caja* income *(ramos de cargo)* were being collected as well – a task which demanded the addition of several hundred numbers for each year. Even with an adding machine such work is slow, and complete accuracy cannot be guaranteed. In occasional years, as the Source column of Table 1 shows, there was no *Libro común* or *duplicado.* In such cases, a *Libro real manual* was used, where available. The *Libros manuales* were the day-books of the *caja,* into which all incoming payments in one year were entered in chronological order of receipt, with no separation by *ramo.* Separate *Libros manuales* recording silver tax payments alone have survived for a number of years, particularly in the second half of the seventeenth century. These frequently contain monthly totals of tax paid. Comparison of amounts of tax recorded in the *Libros comunes* and the *Libros manuales,* where volumes of both sorts exist for a single year, shows negligible or no variation between them. Since figures were copied from the *Libro manual* into the *común,* no discrepancy should be ex-

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pected. For occasional years of the late seventeenth century, and for 1706–35, tax yields were taken from Vol. 417 of the *caja real* archive in Potosí – a small book entitled: MDCLXII. *Libro Manual Borrador de Resúmenes de Quintos de la Real Contaduría de esta Villa Imperial de Potosí, que empieza a 1° de enero de 1667 años,* which records silver taxes received between 1667 and 1770. In the many years of the late seventeenth century where the tax shown in this volume can be compared with that given in some other source, only minute discrepancies are apparent. CR 417's record for the eighteenth century may thus be regarded with some confidence, and so was used after 1705 instead of annual account books, to save time.

The only years for which the archives of Seville and Potosí did not yield a tax figure were 1555 (in part), 1556–58 and 1643. All these lacunae, except 1555, could be filled using data from a table of Potosí silver tax yields, covering the period 1556–1780, given in the Mercurio Peruano of 20 January 1793. The publishers of this table declared that the figures had been sent to them from Potosí itself – presumably by a correspondent with access to the *caja real* records[8]. Since the amounts of tax shown in the Mercurio Peruano are in *pesos corrientes* (of unspecified value, but presumably of 272 *maravedís,* the normal value of such *pesos*), it was necessary to convert them to *pesos ensayados* of 450 *maravedís* for inclusion in Table 1. The factor required to make this conversion should be 272/450 (= 0.60444). But this factor does not appear entirely appropriate here. If, for example, the total silver tax shown in the Mercurio Peruano's table for the years 1641, 42, 44 and 45 (= 3,615,753 *pesos corrientes*) is multiplied by the factor, the result is 2,185,522 *pesos ensayados;* which differs from the total for those years yielded by the original Potosí accounts, of 2,236,121 *pesos ensayados.* An unequivocal reason for this variation is hard to find. Since the Mercurio's informant presumably had to calculate his figures in *pesos corrientes* from the *peso ensayado* quantities shown in the Potosí accounts, the most plausible explanation is that for some reason he did

8) See 'Apéndice de la sociedad [de Amantes del País] a la Historia de Potosí', in: Mercurio Peruano, Núm. 214, 20 de enero de 1793. The 'Historia de Potosí' referred to is an article by Joseph Baquíjano y Carrillo entitled: Historia del descubrimiento del cerro de Potosí, fundación de su Imperial Villa, sus progresos y actual estado, published in the three preceding issues of the Mercurio Peruano (10, 13, 17 January 1793).

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not derive his *pesos corrientes* by multiplying the *ensayado* by a factor of 450/272. Given the discrepancy, a surer method of obtaining a 1643 tax figure in *pesos ensayados* from the *corriente* sum shown in the Mercurio seemed to be to establish the actual ratio between the *corriente* amounts given in the Mercurio for the years around 1643 and the corresponding *ensayado* amounts shown in the Potosí accounts; and then to use that ratio as a factor to convert the Mercurio's figure for 1643 into *ensayado*. The ratio between the sum of the Mercurio's *corriente* tax figures from 1641, 42, 44 and 45, and the *ensayado* total for the same years presented by the *caja* accounts, was therefore calculated. It was 3,615,753 *corriente:* 2,236,121 *ensayado* (= 1:0.61844). The tax yield of 924,659 *pesos corrientes* given by the Mercurio for 1643 was multiplied by the factor 0.61844, to give an equivalent in *pesos ensayados* of 571,846, as shown in Table 1. A possible fallacy exists in this method. If the ratio year by year between the Mercurio's *corriente* figures and the Posotí accounts' *ensayado* figures varied greatly (meaning that the Mercurio's figures were probably not derived from the Potosí accounts, or at least not derived by a consistent method), then the ratio between the sums of the *corriente* and *ensayado* tax yields for 1641,42,44 and 45 would be no more than the average of the possibly random conversion ratios for those four years. If that were the case, using that average to find an *ensayado* tax figure for 1643 might give a wrong result. The possibility that this error had been made was almost eliminated by calculating the individual ratios for the years just mentioned between the Mercurio's *corriente* figures and the Potosí accounts' corresponding *ensayado* amounts. These ratios proved to be quite constant: 1641, 1:0.61836; 1642, 1:0.61854; 1644, 1:0.61862; 1645, 1:0.61824. It is therefore clear that whoever supplied the *corriente* equivalents of the Potosí silver tax income to the Mercurio Peruano was very nearly consistent in converting from one unit into the other. The small variations in the conversion factor that can be observed may be due to his arithmetical mistakes.

A similar method was used to obtain the equivalents in *pesos ensayados* of the *corriente* tax figures given in the Mercurio table for 1556–58. It was not possible in this case to calculate a *corriente* to *ensayado* ratio from the years both before and after 1556–58, since the Mercurio series begins in 1556. A ratio was therefore calculated

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for the years 1559–61, and was found to be 1:0.61761. The *corriente* values shown in the Mercurio for 1556–58 were multiplied by 0.61761 to give the *ensayado* tax figures contained in Table 1. The reason for the slight variance between the 1559–61 ratio and that found for 1641, 42, 44 and 45 is probably that the *ensayado* tax figures for 1559–61 given in Table 1 are not quite accurate. As will be shown below, tax figures for those early years contained a small proportion of *plata corriente*, of uncertain value, which has been converted into *pesos ensayados* in the figures of Table 1, so that the yield of the silver tax should be expressed in a single unit. (To minimise confusion, it should be explained at this point that there was a considerable difference between *plata corriente* and the *peso corriente*. The former was a general term for unassayed silver of variable fineness; the latter was a minted and circulating coin, of, at least in law, a certain minimum fineness, and valued at 272 *maravedís.)* Lack of precision in that conversion may have caused slight misrepresentation of the value of the silver tax in the period 1559–61, and hence the small difference between the *corriente* to *ensayado* ratio of those years and the calculated for 1641, 42, 44 and 45.

Once the values for 1556–58 had been established, a tax yield for 1555 was calculated, merely as the arithmetic mean of the values for 1553, 54, 56 and 57. The resulting figure is arbitrary but probably not grossly inaccurate. The tax figure for 1555 is thus the only one in Table 1 not derived directly or indirectly from an account of the *caja real* of Potosí. No figure was found during research for the period before July 1549, though silver was probably being produced in Potosí as early as 1545 [4].

Rate of tax

The basic rate of tax on silver production during the period shown in Table 1 was a fifth – the *quinto*. Subsoil rights belonged to the Crown, and miners paid the *quinto* in return for access to minerals [5].

4) Despite its promising title, Bailey W. Diffie's article: Estimates of Potosi mineral production, 1545–1555, in: Hispanic American Historical Review, vol. 20, 1940, pp. 275–83, contains no useful data on output in the early years.
5) Ismael Sánchez-Bella, La organización financiera de las Indias, siglo XVI, Sevilla 1968, p. 87 (text and n. 4).

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That, at least, was the principle according to which the tax was levied. In practice the *quinto* was viewed merely as a valuable source of income to the Crown; and in discussions between miners and officials about the tax, the theoretical reason for its existence was seldom, if ever, raised. The fifth was reduced to a tenth (*diezmo)* by a *real cédula* of 23 January 1735[6], which is the major reason why Table 1 has not been carried past that point. Levy of a tenth started in Potosí in July 1736, and with that change, the district's silver industry entered on a new phase of its history. The tax reduction was intended to revive the industry, and was successful in doing so. After more than a century of decline, production in Potosí began to rise steadily in the 1740's. That revival awaits its historian.

A further tax, known as the *derecho de Cobos,* was normally levied on silver production. This was in origin the fee paid to an official assayer of precious metals, rated at 1% of the metal examined. Alonso Martínez de Pastrana, *visitador* of the *caja real* of Potosí, described it in 1619 as the *uno por ciento del marcador*[7]. The American income from this levy was granted by Charles V to his secretary Francisco de los Cobos, as an adjunct of the office he also bestowed on him of assayer (*fundidor, marcador mayor y ensayador)* of all gold and silver refined in Peru and New Spain. Cobos was to enjoy the income for his lifetime, and his son should inherit it for his life[8]. In fact, the grant was revoked in 1552; and after then the tax was collected as part of the Crown's general income. In Potosí, the yield of the *derecho de Cobos* did not go to pay the assaying officials. They collected separate dues on the silver they examined.

There is no reference to the *derecho de Cobos* in the accounts of the Potosí *caja* before 1559, and for the purposes of this article it has been assumed that the tax was not collected before then. After 1559,

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[6]) Herbert S. Klein, Las finanzas del virreinato del Río de la Plata en 1790, in: Desarrollo económico, Núm. 50, vol. 13, Buenos Aires, julio-septiembre de 1973, p. 396.

[7]) AGI Charcas 36, *Potosí. 8 de marzo 1619. Del contador Pastrana sobre la visita que ha hecho de aquella caja y otras y el estado que tienen y lo que se debe en ellas,* f. 5.

[8]) Sánchez Bella, La organización..., p. 87, n. 4, and p. 117, n. 156. Also BAN Minas T. 135, item 5 (Minas catalogue No. 1058), La Plata 2 March 1684, *1684. Borrador de un informe por Don Bartolomé González de Poveda, presidente de esta Real Audiencia... sobre el origen del derecho llamado de Cobos en la Casa de la Moneda de Potosí...,* f. 3.

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the *quinto* figures shown in Table 1 include, in addition to the fifth, a varying levy for *Cobos*. In the *caja* accounts, separate figures for *quinto* and *Cobos* are rarely given. This is a hindrance when, as here, it is wished to use the figures of tax received in *pesos ensayados* as a source for calculating production of silver by weight. If the tax were a simple fifth, it would be an easy matter to estimate the production on which that fifth was levied – multiplication by 5 and conversion of the resulting number of *pesos* to their equivalent in marks or other units of weight would be all the calculation needed. The arithmetic becomes a little more complicated when an additional levy for *Cobos* is included in the available *quinto* figures; and a further complication is introduced by the fact that in Potosí, *Cobos* was not always levied at the same rate. In order to obtain as close an approximation as possible to production by weight in any part of the period under consideration, the rate of *Cobos* must be known. From 1559 to 1585, it was 1%. From 1586 to 1652, it was increased to 1.5%[9]. After 1652, the effective rate becomes rather hard to determine. In that year a *visitador* of the Casa de la Moneda, Dr. Francisco de Nestares Marín, decided to abolish the levy of Cobos altogether on silver which was to be coined. Cancellation of this tax was the only way he could find to reduce the operating costs of the *mercaderes de plata* – the silver dealers who bought refined but unminted silver from miners and had it coined on their own account at the Casa de la Moneda. If mintage costs were not reduced, so Nestares predicted, the *mercaderes* would go out of business and the production of coin, essential to commerce and administration, would cease. Cancellation of *Cobos*

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9) This increase was introduced by a treasurer of the Potosí *caja*, Diego de Robles Cornejo. According to Alonso Martínez de Pastrana, Robles had no authority for increasing the rate, besides a *real cédula* issued by Philip II for New Spain in 1578, which Robles brought with him to Potosí. This was probably a *cédula* reproduced in Diego de Encinas, Cedulario Indiano (1596), vol. 3, pp. 402–03, directed by the king to viceroy Enríquez of New Spain from El Pardo, 8 July 1578, and referring to the taxes to be levied on precious metals in New Spain. It specifically mentions the 1.5% rate. Pastrana, as an official of the Tribunal de Cuentas of Lima, should, however, have been aware that a law directed to all *cajas reales* of the Indies, given by Charles V and Prince Philip in Madrid, 5 June 1552, ordered that a 1.5% levy should be taken for '*fundición, ensayador y marcador*' (Recopilación de leyes de los reinos de las Indias . . ., Madrid 1681, *Libro 4, Título* 22, *Ley* 13). For Pastrana's comments on the matter, see AGI Charcas 36, *Potosí. 8 de marzo 1619. Del contador Pastrana sobre la visita* . . ., f. 5.

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was approved by the viceroy [10]. It is difficult to know, however, how much of the silver produced in the Potosí district was minted at this time. And the *caja* accounts fail to mention *Cobos* again until 1684, which may mean that the tax was not levied on any silver at all between 1653 and then. In this absence of information, it has been assumed that the *quinto* figures recorded in the Potosí *caja* accounts from 1653 to 1683 contain *Cobos* at a 1% rate. This is an arbitrary assumption, but it cannot cause errors of more than 1% in the conversion of the *quinto* figures to weight of silver produced. After 1684, the rate of *Cobos* is variously recorded in accounts as 1% or 1.2% *(uno y quinto por ciento).* For some years, two different accounts exist, one indicating a 1% rate, the other 1.2%. Fortunately, there are a few years (1684–88) in this last part of the seventeenth century where *quinto* and *Cobos* are separately recorded. Examination of the accounts for those years reveals that the 1.2% rate was apparently being charged; though that conclusion is not absolutely certain. It is clear that the *derecho de Cobos* was levied in these years rather erratically. Either it was not collected on all silver on which *quinto* was paid, or else it was collected at a varying rate. But on the evidence of the 1684–88 accounts, a *Cobos* rate of 1.2% has been assumed for the period 1685–1735.

Estimate of weight of silver taxed

Once the rate of tax is known, the weight of silver on which tax was levied can easily be calculated from the tax yield. In Table 1, the results of this calculation are shown. The *quinto* figure (plus *derecho de Cobos,* where applicable) in *pesos ensayados* has been converted into the quantity of silver, in marks, that yielded that *quinto.* If tax was collected on all the silver produced in the Potosí district, then the figures in marks show the district's total output. A series of factors was calculated in order to make the conversion. The *peso ensayado* was valued at 450 *maravedís.* 2380 *maravedís*

10) PCM CR 316, f. 148 – 8v, Potosí 28 August 1652, *Auto del señor presidente [Nestares Marín] en razón de la quita del uno y medio por ciento de Cobos, que llaman, y la imposición sobre las barras;* and f. 149 – 9v., Lima 30 July 1652, *Provisión del gobierno en que se manda quitar el uno y medio por ciento de Cobos, que llaman, sobre las barras.*

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was the typical value of a mark of fine silver produced in Potosí. (The amalgamation process for refining silver ore, used by almost all silver producers in Potosí once it was introduced in 1572, yielded silver of high fineness.) If the rate of tax is a simple *quinto*, the factor for converting tax yield in *pesos ensayados* to the number of marks taxed is 5 × 450/2380 (= 0.945378). A factor which takes the *derecho de Cobos* into account can be calculated in the same way. A small complexity is introduced by the fact that when *quinto* plus *Cobos* were being levied, the latter was deducted first from the quantity of silver being taxed, and the *quinto* then taken of that quantity less the *Cobos*. Thus if the *derecho de Cobos* stood at 1%, that percentage was deducted first and the *quinto* taken of the remaining 99%. The total percentage of tax levied was, therefore, 20.8%; not 21%, as might at first sight appear[11]. The conversion factor from tax to marks of silver taxed is, accordingly, 100/20.8 × 450/2380 (= 0.909017). By a similar method, the conversion factor from *quinto* plus 1.2% *Cobos* is 0.902078; and from *quinto* plus 1.5% *Cobos*, 0.891866.

Plata corriente

In order to collect the taxes due on silver, the treasury officials' practice was to take by weight a fifth (and the percentage due to *Cobos*) of the consignment of silver brought to the *caja real* by its owner, and convert the weight, according to its fineness, into *pesos ensayados* – in which unit the account was kept. This procedure was simple once the amalgamation process had been introduced in 1572, since that process gave silver of consistently high fineness. But before 1572 all silver was produced by smelting; and smelting ap-

11) This procedure in taking *Cobos* and *quinto* was noted in 1619 by Alonso Martínez de Pastrana, who said it had been the rule in Potosí since 1585. (AGI Charcas 36, Alonso Martínez de Pastrana, *Potosí. 8 de marzo 1619. Del contador Pastrana sobre la visita...*, f. 4v.). Examination of the yields of *quinto* and *Cobos* in 1684–88, when separate figures for each tax are given in the accounts, suggests, though, that by then the *quinto* was being taken first, and the *Cobos* of the remaining four-fifths. The total percentage of tax collected is the same, whichever of the two sequences is followed. For example, in the case of *quinto* + 1% *Cobos*, total tax = 1/5 + (1/100 × 80/100) or 1/100 + (1/5 × 99/100). The result in both cases is 20.8%.

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pears to have continued, on a decreasing scale, for several years after 1572. Silver refined by smelting was of very uneven quality. Variations in ores and in the expertise of refiners meant that some of it was of low fineness: that is, it contained a substantial proportion of other metals, especially copper. Nevertheless, in the period before Toledo founded the mint in Potosí in 1572, lack of circulating medium in the district made it inevitable that this low quality silver should serve as a means of exchange. It was known as *plata corriente*. It seems to have circulated in the form of mere lumps or bars; that it was not assayed is suggested by the existence and use at the same time of *plata ensayada*. A *quinto* of *plata corriente* was collected at the Potosí *caja* until 1578. After then, there is no record of *corriente* in the *quinto* accounts. Presumably only amalgamated silver was received and taxed from then onwards.

A difficulty arises in determining how much this early *plata corriente* was worth in terms of *plata ensayada*. Only slight and infrequent indications are given in the Potosí accounts of the fineness of the *corriente* received in *quinto* payments. From 1549 to 1573, a mark of *plata corriente* seems generally to have been valued at 2,000 *maravedís*, and a *peso* of *corriente* at 400 *maravedís*. Assuming that a *peso* of *plata ensayada* was valued at 450 *maravedís*, it is a simple matter to convert *corriente* to *ensayada*. The premium in the conversion – termed *interés* in transactions of the time – is 12.5%. That is to say, 100 *pesos ensayados* were attributed the same value in *maravedís* as 112,5 *pesos corrientes*. After 1573, the *interés* rises rapidly until 1577, when it reaches 56.25%, at which level it remains stable thereafter. The rates of *interés* used here to convert *quintos* in *corriente* to *ensayada* during the period 1574–77 were: 1574, 35%; 1575, 45%; 1576, 55%; 1577, 56%. These cannot be the exact rates of premium obtaining throughout each of those years, since the *interés* was increasing continuously and, moreover, *plata corriente* was, by its nature, of most variable quality. But the distortions incurred by using these rates are certainly not great. In any case, the proportion of *plata corriente* in the whole yield of *quinto* and *derecho de Cobos* was not high: about 11.5% in the period 1550–54; about 18.2% in 1570–74. It is difficult to say why the quality of *plata corriente* fell so rapidly after 1573. Some connection may be suspected with the introduction of amalgamation in 1572.

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Perhaps silver producers who persisted in using smelting to refine their ores found their costs rising in comparison with those of amalgamation, and were tempted to adulterate their silver with other metals; or at least to economise on fuel by not smelting to the previous degree of purity.

Tax evasion

The amounts of silver tax collected at the *caja real* of Potosí are easy enough to determine. But the question this article sets out to answer is: how much silver was produced in the Potosí district? It is therefore necessary to know whether tax was paid on all the silver produced, or only on some fixed or variable proportion of it. This is the central procedural problem in trying to derive production from tax records. It has long been suspected that a large part of the Potosí district's silver was illegally exported, without being taxed, through commerce in the River Plate. Some was doubtless also exported, untaxed, through Callao, under the noses of the viceroy and other high functionaries of Peru in Lima. Even at the end of the colonial period itself, it was generally believed that two-thirds of Potosí's production had not been taxed[12].

Do the figures in Table 1 which purport to represent annual production therefore indicate only a third of the district's true output? No definite answer can be given to the question. There is no better source than the yield of *quinto* and *derecho de Cobos* from which to estimate production. Other sources are more remote from production than the *quinto* record, and their use therefore introduces more unknowns into the calculation of output. From the records of the Potosí mint itself, well preserved in the Casa de la Moneda, it would be possible to find out how much coin was struck there year by year; and to some extent, no doubt, the amount of coin produced would be indicative of silver output. But there was rampant fraud in the mint; and it is impossible to know whether a constant proportion of output was being coined. The author admits that he has not done the archival work necessary to calculate production of coin in Potosí.

12) Mercurio Peruano, 20 de enero de 1793, Apéndice de la sociedad a la Historia de Potosí, p. 57.

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There is no good reason to believe, however, that the proportion of total silver output that escaped taxation varied greatly over time. It is true that when overall output was falling, there was probably more evasion of tax than when it was rising – since, other things being equal, profits would tend to be lower during a fall in production, and the temptation and need to avoid costs, such as *quinto* and *Cobos*, correspondingly greater. When production data are derived from tax collected, this effect would produce an apparent exaggeration of the rate of decline in output, especially at the beginning of the decline. But it would not alter the long-term direction of the production trend. It is possible, therefore, that in the seventeenth century, and the early eighteenth, when the Potosí district's output was certainly falling, there was an increase of tax evasion in comparison with the sixteenth century; and that therefore the levels of output indicated in Table 1 and Graph 1 are too low, by an unknown percentage, from about 1600 onwards. It is extremely doubtful, however, that tax evasion grew so much and so progressively in the seventeenth century as to produce an apparent decline in output of the magnitude of that suggested by Table 1 and Graph 1.

One method does exist of checking whether the levels of production indicated by the yield of *quinto* and *derecho de Cobos* are likely to be near true levels of output. Nearly all silver in the Potosí district was refined by amalgamation with mercury; there are very few references to smelting after about 1580. The amounts of mercury arriving in Potosí are recorded in the accounts of the *caja real*. Mercury was lost in the refining process, at a rate which varied with the quality of the silver ores being treated. Generally speaking, the lower the silver content of the ore, the more mercury was lost in producing one unit of silver. The quality of ores found in the mines of Potosí itself fell, overall, from the time when mining began. As the mines became deeper, the ores in general became poorer; though large amounts of good ore were certainly discovered in the *Cerro Rico* of Potosí in isolated concentrations, all through the seventeenth century, and were probably still found from time to time in the nineteenth. It is also true that other mining discoveries in the district of Potosí, made from the late sixteenth century onwards, yielded excellent ores on occasion, though not usually for very long. There can be little doubt, nevertheless, that the average quality of ores in the district fell

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as exploitation of them progressed. Research has so far revealed only two estimates by contemporary witnesses of the rate of mercury loss suffered in producing silver in Potosí. The first was given in 1588 by the then *corregidor* of the city, Don Pedro Osores de Ulloa. He stated that with a new variety of the amalgamation process introduced the previous year, the weight of mercury lost, when *paco* ores (silver oxides) were being refined, was equal to the weight of silver produced. In the standard amalgamation process, he said, up to a third more mercury was lost. These rations may be expressed numerically in this way: with the improved amalgamation process, loss of 100 lbs. (one *quintal*) of mercury yielded a gain of 100 lbs. (200 marks) of silver; by the standard process, loss of one *quintal* of mercury yielded a minimum of 75 lbs. (150 marks) of silver[13]. Silver oxides were the ores most commonly mined and processed in Potosí. The second estimate of mercury loss is from 1635. The President of the Audiencia of Charcas noted that the standard current yield of one *quintal* of mercury was 80 lbs. (160 marks) of silver[14].

It is instructive to compare these estimates with the ratios of mercury lost to silver produced that the Potosí accounts actually reveal. The ratios are shown in Table 2, by decades. Records of mercury arrivals in Potosí in the sixteenth century are incomplete, so the earliest decade that can be shown in the Table is 1593–1602. Amounts of mercury arriving in one decade have been compared with indicated silver output in a decade starting one year later: for example, mercury arrivals in 1593–1602 are compared with silver produced in 1594–1603. The dates have been staggered in this way because mercury arriving at Potosí was not normally distributed immediately to refiners. It might remain in store for several months before being used. Thus the mercury used to refine ores in 1594 would probably have arrived in Potosí in 1593, and so on throughout the decade until 1603. Mercury data for the late seventeenth

13) See AGI Charcas 35, MS 75, f. 6v. (part of the *Relación que Don Pedro Osores de Ulloa, corregidor de la Villa Imperial de Potosí, envió al virrey Conde del Villar sobre lo tocante al nuevo beneficio hecho en Potosí por Andrea Carlos Corso;* n. d. but certainly February/March 1588). The new process referred to by Osores was one in which finely ground iron was added to the amalgam. Its inventor was Carlos Corso de Leca, one of the leading figures in the mining community of Potosí in the late sixteenth and early seventeenth centuries.

14) AGI Lima 45, Potosí 28 February 1635, the President of the Audiencia of Charcas, Don Juan de Lizarazu, to Crown (letter marked 6).

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century are uncertain and so have not been included in Table 2. Although mercury was not generally distributed immediately after its arrival, neither did it accumulate in large quantities from year to year in the treasury's store in Potosí. It is unlikely that the ratios shown in Table 2 have been much distorted because the mercury data used to calculate them referred to mercury arriving rather than to mercury distributed.

What is shown by comparison of the indicated with the estimated ratios of silver produced and mercury lost? The argument may be summed up in this way: if 1) the quantities of mercury shown in Table 2 to have entered Potosí were the only mercury available to the silver producers, 2) amalgamation was the only refining method used, 3) the estimates of Osores de Ulloa and the President of Charcas were correct, 4) the yields indicated by the Potosí accounts coincide with those estimates; then the output of silver shown in Table 2 for the decade to which Osores' and the President's estimates apply is likely to have been the true output of silver in the district of the *caja real* of Potosí.

The first condition is the most difficult one to verify. In law, the Crown held a monopoly of the supply of mercury to miners in all the American colonies of Spain. Officially speaking, no mercury might enter Potosí except on the king's account; and as it entered, the quantity was noted. It is from those records of entries that the amounts of mercury shown in Table 2 have been calculated. But it is possible that official records were incomplete, or that mercury entered illegally in private hands. The mines of Huancavelica provided most of Potosí's mercury. In his study of those mines, Lohmann Villena says that much mercury produced there was sold illegally to merchants instead of being passed directly to the Crown officials who, in law, were the only purchasers. By the mid–1660's, Lohmann implies, illegal sales were so great that official production fell far short of actual output[15]. Some of this 'illegal' mercury may have found its way into the Potosí district. Yet, if so, there is a strange lack of comment about it from the treasury officials of Potosí and the officers of the Audiencia of Charcas who frequently visited the city to make inspections of various sorts. Such

15) Guillermo Lohmann Villena, Las minas de Huancavelica en los siglos XVI y XVII, Sevilla 1949, p. 371.

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people normally reported any flouting of the king's interest rapidly and vigorously – some out of sense of duty, others with an eye to promotion or other rewards. It is unlikely, though possible, that they were all in league themselves in the business of trafficking privately in mercury. On balance it is clearly possible that some private mercury reached Potosí, but it is improbable that the quantities were large in comparison with amounts of Crown mercury delivered to the city.

The second and third conditions are easily accepted. As said before, there is little evidence of smelting in Potosí after 1580, and amalgamation was the only other method of refining that the technology of the time offered. The estimates made by Osores and the President were probably correct, since they were drawn from the current experience of the miners of their times. Does the fourth condition, then, hold? Do the estimates of yield accord with the yields shown by the Potosí accounts? For the decade 1594–1603 there is good agreement. The indicated ratio of 166.3 marks produced per *quintal* of mercury lost falls comfortably within Osores' range of 150–200 marks per *quintal*. Admittedly, Osores' estimate referred to 1587, rather before the beginning of the decade in question. But the general quality of ores did not change greatly in the final fifteen years of the sixteenth century. Furthermore, Osores' upper figure of 200 marks applied only to the results obtained with the improved amalgamation process of 1587. That process was not universally adopted in the Potosí district. Consequently, some refiners would be obtaining yields of less than 200 marks per *quintal* of mercury. It is likely, therefore, that the output of silver suggested by the tax records of the Potosí *caja* for the years 1594–1603 is quite close to real output in that decade.

The silver to mercury ratio given by the President of Charcas in 1635 is somewhat higher than that indicated by the accounts: 160 marks per *quintal* was the estimate, while the accounts show a ratio of about 140.5 marks to the *quintal*. It seems, therefore, that the accounts understate true production around 1635 by some 12%. This is not a great distortion, and could be attributed to increased tax evasion in the seventeenth century in comparison with the sixteenth.

It is a pity that no more estimates of mercury consumption in the amalgamation process have so far come to light. Obviously, two

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figures constitute a poor base for an argument. Yet even with two figures, one conclusion of near certainty can be reached. If they are even roughly typical, it seems unlikely in the extreme that only a third, or even only a half, of the silver output of the Potosí district was taxed. If only a third had paid the *quinto* and *derecho de Cobos*, then the true levels of production would be three times higher than those shown in Table 1 and Graph 1. If that were the case, the weight of silver produced per *quintal* of mercury lost would be three times higher than the figures shown in Table 2 – that is, taking the minimum and maximum levels, between about 350 (3 × 117.8) and 500 (3 × 166.3) marks. Such yields are beyond the bounds of belief. Throughout sixteenth and seventeenth century Spanish American mines, the generally accepted ratio was 100 marks per *quintal* of mercury lost. In the most productive silver mining district of seventeenth century Mexico, that of Zacatecas, 120 marks per *quintal* were considered a high yield[16]. In late eighteenth century Potosí 120–130 marks per *quintal* were considered normal[17]. Thus with yields of over 150 marks per *quintal*, seventeenth century Potosí was well above the norm for its time. Only a vast movement of illegal, privately-traded mercury, totalling twice the arrivals of Crown mercury, could have produced apparent yields of 350–500 marks per *quintal*. There is no evidence of private traffic in mercury on that scale.

The general movement of the silver to mercury ratios shown in Table 2 is worth a short commentary. An overall downward trend is clear, which probably reflects the general fall in the quality of ores in the Potosí district as time went by. For quite a simple reason, more mercury was lost per unit of silver gained, as the quality of ores fell. The loss was mainly mechanical: mercury escaped literally down the drain in the stage of the amalgamation process where the ore was washed. As the silver content of the ore declined, more ore had to be refined, and washed, to produce the same amount of silver; and

16) D. A. Brading and Harry E. Cross, Colonial silver mining: Mexico and Peru, in: Hispanic American Historical Review, Vol. 52, No. 4, November 1972, pp. 545–79, p. 556. Also, P. J. Bakewell, Silver mining and society in colonial Mexico, Zacatecas 1546–1700, Cambridge (England) 1971, pp. 188–96.

17) Pedro Vicente Cañete y Domínguez, Guía histórica, física, política, civil y legal de gobierno e intendencia de la provincia de Potosí, (1791), p. 70 (of the edition used, of Potosí 1952).

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more mercury was consequently washed away[18]. The upward variations in the generally declining course of the yield can be attributed to discoveries of new deposits of richer ores in various parts of the district. The recovery apparent in the two decades 1626–45 is probably due in the main to a rich strike at Chocaya, some 150 kms. south of Potosí, in the early 1630's. (The wealth of Chocaya is the cause of the upward surge of Graph 1 in 1635). The Chocaya boom was short-lived; the mines soon flooded. Silver to mercury yield lapsed again, as general ore quality continued to fall, to lower levels than before. But in the last third of the seventeenth century, yields recovered. Once again, improvement in ore quality is probably the reason. This time it was due to the discovery and exploitation of rich mines in the extreme south of the Potosí district – of which more will be said below.

Mines outside Potosí

There can be no historian of Spanish America who has not heard of Potosí; some will have heard of Porco; there can be very few who have heard of las Salinas de Garci Mendoza, Tatasi, Ocuri, Chocaya, Tomahavi – to mention only a few of the lesser mining centres in the Potosí district. Lesser they certainly were; but at different times each produced a far from negligible quantity of silver. It is, unfortunately, only after 1660 that any estimate can be made of output in mines outside Potosí itself; for only after then do the treasury accounts show separately the tax received on silver produced in Potosí and that received on silver from the rest of the district. The richest mines outside Potosí in the late seventeenth century were those in the district known as the 'provincia de los Lipes', so named after the Indians who lived there. The area was a large and desolate part of the southern *altiplano*, stretching west roughly from the site of modern Uyuni to the ranges bordering the plateau, and south

18) '*Todos los daños que se han experimentado y se experimentan hoy en el gasto y falta del azogue, o la llaman pérdida o consumo, se causan en el lavar los cajones: hasta este punto no hay nada perdido . . .*', Alvaro Alonso Barba, Arte de los metales, Madrid 1640, *libro segundo, capítulo* 21 (ed. used, Potosí 1967). The *cajones* were the large stone troughs in which amalgamation took place.

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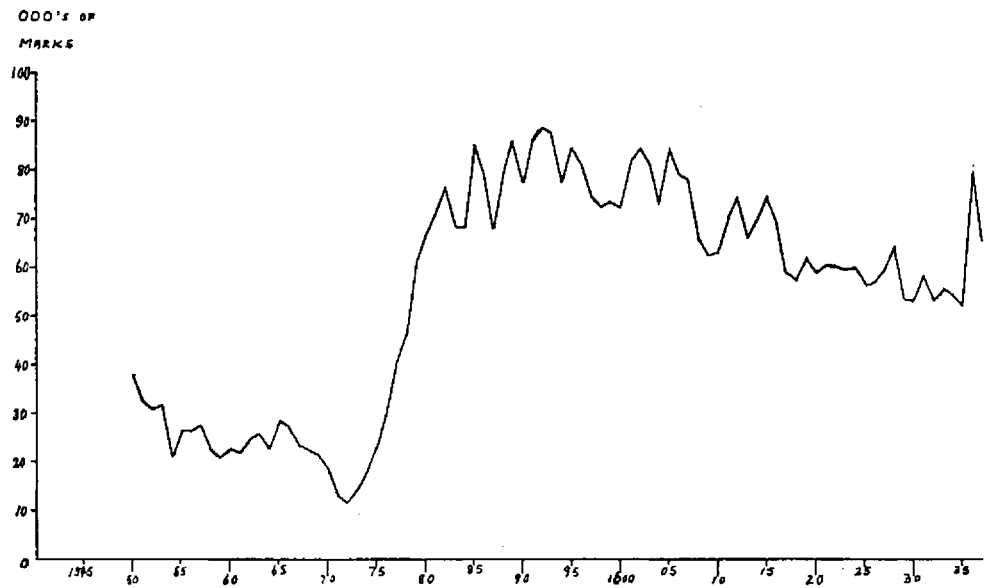
GRAPH I

REGISTERED SILVER PROD
IN THE POTOSÍ DISTRICT
1550 – 1735



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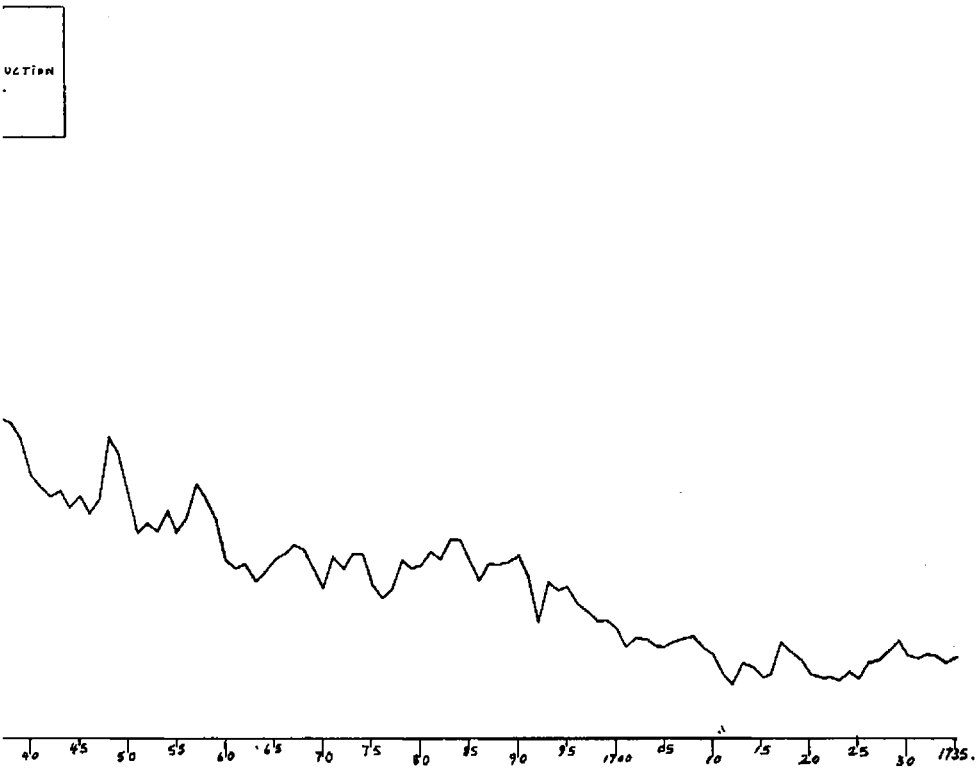

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as far as the northern parts of present-day Argentina. The major mines in los Lipes were Esmoraca, Esmoruco, and above all San Antonio del Nuevo Mundo. Table 3 shows what percentage of the total amount of silver registered for taxing at the Potosí *caja* was produced outside Potosí itself between 1660 and 1720. Notes in the accounts indicate that most of this silver came from San Antonio. Quantities are shown in marks in Table 3, derived from the tax yield by the same methods as were used in Table 1. The proportion from the district varies widely, but in many years before 1700 is over a quarter of the total from Potosí and district together, and in some, over a third. After 1700 it generally declines, for reasons so far unknown[19]. It is plain therefore that though Potosí deserves its fame as a great source of silver, the lesser mines of its district, now mostly unknown even to Bolivians, were no mean workings. Since in 1660 and 1661 the mines outside Potosí were, according to the tax record, yielding nearly 40% of the Potosí *caja's quinto* income, it is probable that they were producing a sizeable proportion of it before that. What proportion, there is no means of knowing.

Causes of variations in output trend

A full exploration of the reasons why production in the Potosí district varied as it did before 1735 would be a lengthy matter. All that will be done here is to state the major determinants of the production trend.

That trend divides naturally into three sections. The first runs from the discovery of the Potosí deposits, usually taken to have been in 1545, to the introduction of amalgamation in 1572. The second section extends over the next 20 years, in which production was rising very rapidly to a peak in the early 1590's. The third consists of the following 140 years, during which production declined gradually, with occasional brief recoveries, until it reached, at the start of the eighteenth century, the levels of the pre-amalgamation era.

The mining history of the first period is shadowy. Its main char-

19) The '*Minas*' section of the Archivo Nacional de Bolivia, Sucre, contains abundant material for the history of the lesser mines of the Potosí district in the late seventeenth century. For lack of time, the author was unable to investigate these manuscripts.

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acteristics were the use of primitive smelting techniques, exploitation of rich ores near the surface, and the employment of small numbers of labourers – that is, small in comparison with the labour force that was to be put to work in Potosí later. It seems that in this early period the Spanish owners of mines took little part in working the deposits, but merely rented their mines out to Indians in return for a part of the ore extracted. As the workings became a little deeper, the quality of ores started to fall, and output, as measured by the *quinto*, declined continuously.

The second period is dominated by the reforms instituted by Viceroy Toledo. His greatest contribution to the restoration of the Potosí industry was undoubtedly to introduce amalgamation – a task which he pursued with vigour and enthusiasm. Since this process could refine economically ores of quite low silver content, mines which had run into ores too poor for smelting suddenly became productive again. Moreover, much ore that had been mined before 1572, but then discarded as of poor quality, could be processed by amalgamation. Toledo's other great innovation, a less happy one, was the *mita*. He arranged that forced Indian labour should be brought to Potosí from a large number of towns and villages, of which the most distant were not far from Cuzco. The whole *altiplano* to the north of Potosí became the catchment area from which the great labour force was drawn. Toledo designed the *mita* so that, at any given moment, over 4,000 forced labourers should be at work in the mines and refining mills of Potosí. The system probably did not function as intended for very long after his departure from Peru in 1580. But is certainly enlarged the mining industry's labour force to a size far above what it had been before Toledo's time. Real wages were probably lower than before, though that seems to have been far from Toledo's intention. He appears to have sincerely believed that, with the growth of production in Potosí resulting from amalgamation, Indians would profit materially from being sent to work there[20]. The amalgamation process demanded machinery for crushing ores. A major characteristic of this second period was, therefore, large capital spending on refining mills, and on dams for storing water to drive the mills during the dry part of the year.

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20) See for example para. 23 of his letter (*gobierno*) to the Crown, Potosí 20 March 1573, in AGI Lima 29, vol. No. 1, f. 26.

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In the third, long period, most of the tendencies of the second were reversed. The quality of ores fell – though, in truth, that was no more than the continuation of an earlier trend. What was new after 1590 was that, whereas in the 1570's amalgamation had made it possible to process at a profit ores that could not be refined profitably by smelting, now there was no technological innovation available to deal with ores of quality so poor that amalgamation could not extract the silver from them economically. With the ever increasing depth of mines, *negrillos* (silver sulphides) came to form a growing proportion of the ore extracted. Experimentation with new methods of processing *negrillos* never ceased, but no adequate technique was discovered. Another consequence of the increasing depth of the shafts was a rise in the costs of extraction. Labour costs also probably rose. Decline of Indian population in the area from which the *mita* was drawn, caused partly by disease and ill treatment, and partly by the flight to other areas of Indians who wanted to avoid the *mita*, meant that ever fewer forced labourers worked in Potosí; the fall in the number of *mitayos* was to some extent made good by an increase in the use of voluntary workers. Voluntary labour was dearer, though its extra cost may have been offset to some degree by its greater expertise. As costs rose and the quality of ore still declined, profits inevitably fell, or disappeared. It would be logical to suppose that in such a situation new investment also declined; and indeed there is evidence that insufficient new adits *(socavones)* for mine drainage and access to deposits were cut in the seventeenth century, especially in the *Cerro Rico* of Potosí itself. Many of the dams and aqueducts built to provide hydraulic power for milling were allowed to fall into disrepair. Little new mining exploration was undertaken in the *Cerro*. Entrepreneurial energies were directed rather to opening up new mines in other parts of the district, with some success [21].

21) For an account of a successful mining entrepreneur of the late seventeenth century, both at Potosí and in the district, see: Peter Bakewell, Antonio López de Quiroga, industrial minero del Potosí colonial, Universidad Boliviana 'Tomas Frías', Potosí 1973.

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Oruro

Table 4 sets out such production figures for Oruro in the seventeenth and early eighteenth centuries as research has so far revealed. The yield of the silver taxes – a constant *quinto* plus 1.5% *derecho de Cobos* – has been converted into production in marks by the same method as was used for Potosí in Table 1. All remarks made in reference to Potosí about the reliability of the derived production data naturally apply to these Oruro figures. For lack of information on mercury at Oruro, it is not yet possible to check the accuracy of the output figures shown in Table 4 through calculations of mercury consumption per unit of silver produced.

That there was silver in the hills of Oruro was known in the time of Toledo. But it was not until 1606–07 that the major strikes were made that caused Oruro to become a large producer of silver, second only to Potosí in the province of Charcas[22]. In 1607, immediately the potential of the mines became apparent, a *caja real* was founded, doubtless to ensure that evasion of silver taxes should be as small as possible. Thereafter the *caja* of Oruro remained as an enclave in the jurisdiction of the *caja* of Potosí, its main revenue coming from the silver taxes paid by the miners of the town (with perhaps a small amount of tax being paid by silver producers in the nearby mines of Paria), and from the sale of mercury to the miners. Geographically, the mines of Oruro should perhaps be considered as a component of the silver industry of Potosí. But production at Oruro has not been added here to that registered at the *caja* of Potosí, partly because Oruro was a separate entity, being a town of some size with a sense of its particular identity, and partly because the production data found so far for Oruro are incomplete. The history of

22) Two letters of viceroy Montesclaros to the Crown in 1608 and 1609 summarise the history of Oruro up to that time. (See AGI Lima 35, El Callao 12 April 1608, Montesclaros to Crown, No. 199, para 2; and AGI Lima 35, vol. No. 2, El Callao 29 March 1609, Montesclaros to Crown, *Minas*, para 3). Alberto Crespo Rodas gives a good account of the town's early days in La fundación de la Villa de San Felipe de Austria, in: Revista Histórica, Academia de la Historia, Lima 1967. See also José de Mesa and Teresa Gisbert, Oruro. Origen de una villa minera, in: La minería hispana e iberoamericana, contribución a su investigación histórica, vol. 1, pp. 559–90, (VI Congreso internacional de minería, Ponencias del I coloquio internacional sobre historia de la minería, Cátedra de San Isidro, León 1970).

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the town and its industry is all but unknown. No suggestions will be ventured here about why production varied as it did. The partial output figures are presented only as a possible point of departure for research into the seventeenth century history of the town and its mines [23].

Abbreviations

AAGN	Argentina, Archivo General de la Nación (Buenos Aires).
AGI	Archivo General de Indias (Seville).
BAN	Bolivia, Archivo Nacional (Sucre).
CR	Cajas Reales (section of the archive of the Casa de la Moneda, Potosí).
Ctd	Contaduría (section of Archivo General de Indias).
Ctt	Contratación (section of Archivo General de Indias).
OBP	Oruro, Biblioteca Pública.
PCM	Potosí, Casa de la Moneda.

23) The archive of the Corte de Justicia in Oruro contains an excellent series of notarial manuscripts for the seventeenth century, starting almost with the foundation of the town in 1607.

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Table 1

Annual totals of *quinto* and *derecho de Cobos* paid at the *caja real* of Potosí, and derived silver production in the Potosí district, 19 July 1549 to 31 December 1735.

year	tax rate	total tax (*pesos ensayados* of 450 *maravedís*)*	production (marks of 2380 *maravedís*)*	source
1549 (19 July–30 Dec.)	1/5	141,961	134,207	AGI Ctd 1795
1550	1/5	401,156	379,244	AGI Ctd 1795
1551	1/5	346,564	327,634	AGI Ctd 1796
1552	1/5	326,492	308,658	AGI Ctd 1797
1553	1/5	337,493	319,058	AGI Ctd 1798
1554	1/5	219,781	207,776	AGI Ctd 1799
1555	1/5	281,256	265,893	**
1556	1/5	278,378	263,177	Mercurio Peruano, 20 Jan. 1793
1557	1/5	289,372	273,566	Mercurio Peruano, 20 Jan. 1793
1558	1/5	239,035	225,978	Mercurio Peruano, 20 Jan. 1793
1559	1/5 + 1% (i.e. 20,8%)	230,544	209,568	AGI Ctd 1844 *ramo* 3
1560	1/5 + 1%	247,598	225,071	AGI Ctd 1844 *ramo* 3
1561	1/5 + 1%	241,449	219,481	AGI Ctd 1844 *ramo* 3

Abbreviations attached to references from the archive of the *caja real* of Potosí, in the Casa de la Moneda:

B5 Libro manual borrador de ... quintos ...
C Libro real común de cargo y data ...
CD Libro real duplicado del común ...
M Libro real manual ...
M5 Libro real manual de las barras que se quintan en esta caja ...
* Figures for tax and production are given to the nearest whole number.
** 1555 figures for tax and production are the arithmetic means of the tax and production figures given for 1553, 54, 56, and 57.
*** For the years 1684–88, *quinto* and *derecho de Cobos* are accounted separately. The *quinto* alone is shown here.

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year	tax rate	total tax (*pesos ensayados* of 450 *maravedís*)*	production (marks of 2380 *maravedís*)*	source
1562	1/5 + 1%	271,656	246,940	AGI Ctd 1801
1563	1/5 + 1%	282,467	256,767	AGI Ctd 1801
1564	1/5 + 1%	251,001	228,164	AGI Ctd 1801
1565	1/5 + 1%	312,913	284,443	AGI Ctd 1844 *ramo* 3
1566	1/5 + 1%	301,887	274,420	AGI Ctd 1801
1567	1/5 + 1%	260,012	236,355	AGI Ctd 1802 *ramo* 1
1568	1/5 + 1%	247,850	225,300	AGI Ctd 1802 *ramo* 2
1569	1/5 + 1%	238,187	216,516	AGI Ctd 1802 *ramo* 3
1570	1/5 + 1%	205,795	187,071	AGI Ctd 1802 *ramo* 4
1571	1/5 + 1%	147,432	134,018	AGI Ctd 1802 *ramo* 5
1572	1/5 + 1%	126,376	114,878	AGI Ctd 1803
1573	1/5 + 1%	154,618	140,550	AGI Ctd 1803 & 1805
1574	1/5 + 1%	197,500	179,531	AGI Ctd 1805
1575	1/5 + 1%	257,419	233,998	AGI Ctd 1805
1576	1/5 + 1%	336,200	305,612	AGI Ctd 1804 *ramo* 2
1577	1/5 + 1%	446,769	406,121	AGI Ctd 1844 *ramo* 3
1578	1/5 + 1%	512,427	465,805	AGI Ctd 1844 *ramo* 1
1579	1/5 + 1%	674,733	613,344	AGI Ctd 1844 *ramo* 2
1580	1/5 + 1%	735,428	668,517	AGI Ctd 1806
1581	1/5 + 1%	788,484	716,745	AGI Ctd 1807A
1582	1/5 + 1%	842,931	766,239	AGI Ctd 1807A
1583	1/5 + 1%	755,279	686,561	AGI Ctd 1807A
1584	1/5 + 1%	751,680	683,290	AGI Ctd 1807B
1585	1/5 + 1%	943,896	858,017	AGI Ctd 1808
1586	1/5 + 1,5% (i.e. 21,2%)	880,794	785,550	AGI Ctd 1808
1587	1/5 + 1,5% (i.e. 21,2%)	758,309	676,310	AGI Ctd 1809 *ramo* 3
1588	1/5 + 1,5%	890,620	794,314	AGI Lima 1595
1589	1/5 + 1,5%	970,084	865,185	AGI Ctd 1809 *ramo* 3
1590	1/5 + 1,5%	869,526	775,501	AGI Lima 132
1591	1/5 + 1,5%	966,196	861,717	AGI Lima 132

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year	tax rate	total tax (*pesos ensayados* of 450 *maravedís*)*	production (marks of 2380 *maravedís*)*	source
1592	1/5 + 1,5%	995,046	887,448	PCM CR 45 C
1593	1/5 + 1,5%	982,979	876,686	AGI Lima 132
1594	1/5 + 1,5%	866,869	773,131	PCM CR 50 CD
1595	1/5 + 1,5%	944,057	841,972	AGI Ctd 1810 *ramo* 1
1596	1/5 + 1,5%	907,862	809,691	AGI Ctd 1810 *ramo* 1
1597	1/5 + 1,5%	838,465	747,798	AGI Charcas 134
1598	1/5 + 1,5%	811,322	723,591	AGI Ctd 1811
1599	1/5 + 1,5%	824,321	735,184	AGI Ctd 1811
1600	1/5 + 1,5%	810,268	722,650	AGI Ctd 1812
1601	1/5 + 1,5%	913,618	814,825	PCM CR 76 CD
1602	1/5 + 1,5%	945,583	843,333	PCM CR 83 CD
1603	1/5 + 1,5%	908,836	810,560	AGI Ctd 1813
1604	1/5 + 1,5%	818,621	730,100	PCM CR 91 CD
1605	1/5 + 1,5%	946,502	844,153	PCM CR 96 C
1606	1/5 + 1,5%	887,332	791,381	PCM CR 100 CD
1607	1/5 + 1,5%	874,766	780,174	PCM CR 102 C
1608	1/5 + 1,5%	742,343	662,070	PCM CR 109 C
1609	1/5 + 1,5%	700,403	624,666	PCM CR 114 C
1610	1/5 + 1,5%	705,762	629,445	PCM CR 125 C + 120 C
1611	1/5 + 1,5%	783,533	698,806	PCM CR 120 C + 134 CD
1612	1/5 + 1,5%	831,872	741,918	PCM CR 134 CD + 139 C
1613	1/5 + 1,5%	742,615	662,313	PCM CR 139 C + 147 C
1614	1/5 + 1,5%	785,128	700,229	PCM CR 147 C + 150 C
1615	1/5 + 1,5%	837,510	746,947	PCM CR 150 C + 160 C
1616	1/5 + 1,5%	777,205	693,163	PCM CR 160 C + 168 CD
1617	1/5 + 1,5%	662,837	591,162	PCM CR 170 C
1618	1/5 + 1,5%	646,239	576,359	PCM CR 177 C
1619	1/5 + 1,5%	695,706	620,477	PCM CR 182 C
1620	1/5 + 1,5%	662,387	590,760	PCM CR 183 C
1621	1/5 + 1,5%	678,813	605,410	PCM CR 191 C
1622	1/5 + 1,5%	675,989	602,892	PCM CR 195 C
1623	1/5 + 1,5%	669,712	597,293	PCM CR 200 C
1624	1/5 + 1,5%	672,306	599,607	PCM CR 202 C
1625	1/5 + 1,5%	633,689	565,166	PCM CR 211 C
1626	1/5 + 1,5%	639,301	570,171	PCM CR 215 C
1627	1/5 + 1,5%	666,784	594,682	PCM CR 223 C
1628	1/5 + 1,5%	724,933	646,543	PCM CR 226 C
1629	1/5 + 1,5%	601,517	536,473	PCM CR 232 C
1630	1/5 + 1,5%	595,015	530,674	PCM CR 238 C
1631	1/5 + 1,5%	659,789	588,443	PCM CR 249 C

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year	tax rate	total tax (*pesos ensayados* of 450 *maravedís*)*	production (marks of 2380 *maravedís*)*	source
1632	1/5 + 1,5%	596,326	531,843	PCM CR 252 C
1633	1/5 + 1,5%	620,800	553,670	PCM CR 253 M
1634	1/5 + 1,5%	608,745	542,919	PCM CR 261 C
1635	1/5 + 1,5%	584,737	521,507	PCM CR 263 C
1636	1/5 + 1,5%	889,815	793,596	PCM CR 269 C
1637	1/5 + 1,5%	735,954	656,372	PCM CR 274 C
1638	1/5 + 1,5%	726,195	647,669	PCM CR 278 C
1639	1/5 + 1,5%	690,881	616,173	PCM CR 282 C
1640	1/5 + 1,5%	605,211	539,767	PCM CR 289 C
1641	1/5 + 1,5%	581,484	518,606	PCM CR 290 C
1642	1/5 + 1,5%	560,273	499,688	PCM CR 294 C
1643	1/5 + 1,5%	571,846	510,007	Mercurio Peruano, 20 Jan. 1793
1644	1/5 + 1,5%	532,742	475,134	PCM CR 296 C
1645	1/5 + 1,5%	561,622	500,892	PCM CR 302 C
1646	1/5 + 1,5%	520,032	463,799	PCM CR 326 C + 303 C
1647	1/5 + 1,5%	551,034	491,448	PCM CR 308 C
1648	1/5 + 1,5%	694,659	619,543	PCM CR 310 C
1649	1/5 + 1,5%	661,200	589,702	PCM CR 314 C
1650	1/5 + 1,5%	567,490	506,125	PCM CR 322 M5
1651	1/5 + 1,5%	476,243	424,745	PCM CR 331 M5
1652	1/5 + 1,5%	495,520	441,937	PCM CR 338 C
1653	1/5 + 1%	471,373	428,486	PCM CR 341 C
1654	1/5 + 1%	516,397	469,416	PCM CR 349 CD
1655	1/5 + 1%	467,727	425,172	PCM CR 353 C
1656	1/5 + 1%	497,203	451,966	PCM CR 361 C
1657	1/5 + 1%	576,011	523,604	PCM CR 369 C
1658	1/5 + 1%	542,850	493,460	PCM CR 374 C
1659	1/5 + 1%	494,445	449,459	PCM CR 376 CD
1660	1/5 + 1%	403,620	366,897	PCM CR 383 CD
1661	1/5 + 1%	385,392	350,328	PCM CR 385 C
1662	1/5 + 1%	394,616	358,713	PCM CR 393 C
1663	1/5 + 1%	354,107	321,889	PCM CR 399 C
1664	1/5 + 1%	374,385	340,322	PCM CR 402 CD
1665	1/5 + 1%	405,369	368,487	PCM CR 408 C
1666	1/5 + 1%	417,842	379,825	PCM CR 411 C
1667	1/5 + 1%	438,341	398,459	PCM CR 415 C
1668	1/5 + 1%	427,390	388,507	PCM CR 419 C
1669	1/5 + 1,5%	385,934	350,821	PCM CR 423 C
1670	1/5 + 1,5%	342,950	311,747	PCM CR 426 C

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year	tax rate	total tax (*pesos ensayados* of 450 *maravedís*)*	production (marks of 2380 *maravedís*)*	source
1671	1/5 + 1,5%	416,152	378,289	PCM CR 431 C
1672	1/5 + 1,5%	385,878	350,770	PCM CR 435 C
1673	1/5 + 1,5%	418,511	380,434	PCM CR 437 C
1674	1/5 + 1,5%	416,585	378,683	PCM CR 441 C
1675	1/5 + 1,5%	351,120	319,174	PCM CR 455 C
1676	1/5 + 1,5%	318,164	289,216	PCM CR 451 C
1677	1/5 + 1,5%	340,158	309,209	PCM CR 455 C
1678	1/5 + 1,5%	403,829	367,087	PCM CR 460 C
1679	1/5 + 1,5%	385,221	350,172	PCM CR 462 C
1680	1/5 + 1,5%	389,114	353,711	PCM CR 463 C
1681	1/5 + 1,5%	424,064	385,481	PCM CR 465 M
1682	1/5 + 1,5%	407,709	370,614	PCM CR 417 B5
1683	1/5 + 1,5%	452,390	411,230	PCM CR 469 M5
1684	1/5 only ***	432,978	409,328	PCM CR 512 C
1685	1/5 only ***	387,689	366,513	PCM CR 476 C
1686	1/5 only ***	345,792	326,904	PCM CR 417 B5
1687	1/5 only ***	381,299	360,472	PCM CR 480 C
1688	1/5 only ***	382,076	361,206	PCM CR 483 CD
1689	1/5 + 1,2%	400,194	361,006	PCM CR 485 C
1690	1/5 + 1,2%	416,215	375,459	PCM CR 487 C
1691	1/5 + 1,2%	367,190	331,234	PCM CR 491 C
1692	1/5 + 1,2%	262,655	236,935	PCM CR 496 CD
1693	1/5 + 1,2%	353,002	318,435	PCM CR 497 C
1694	1/5 + 1,2%	338,198	305,081	PCM CR 504 C
1695	1/5 + 1,2%	344,515	310,780	PCM CR 505 C
1696	1/5 + 1,2%	309,776	279,442	PCM CR 417 B5
1697	1/5 + 1,2%	291,671	263,110	PCM CR 508 C + 510 C
1698	1/5 + 1,2%	268,844	242,518	PCM CR 510 C + 517 C
1699	1/5 + 1,2%	268,563	242,265	PCM CR 417 B5
1700	1/5 + 1,2%	250,739	226,186	PCM CR 524 C + 528 C
1701	1/5 + 1,2%	209,358	188,857	PCM CR 417 B5
1702	1/5 + 1,2%	230,305	207,753	PCM CR 536 M5
1703	1/5 + 1,2%	222,680	200,875	PCM CR 417 B5
1704	1/5 + 1,2%	206,351	186,145	PCM CR 544 M5
1705	1/5 + 1,2%	197,419	178,087	PCM CR 551 M5
1706	1/5 + 1,2%	219,270	197,799	PCM CR 417 B5
1707	1/5 + 1,2%	225,339	203,273	PCM CR 417
1708	1/5 + 1,2%	231,372	208,716	PCM CR 417
1709	1/5 + 1,2%	206,581	186,352	PCM CR 417
1710	1/5 + 1,2%	191,074	172,364	PCM CR 417

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year	tax rate	total tax (*pesos ensayados* of 450 *maravedís*)*	production (marks of 2380 *maravedís*)*	source
1711	1/5 + 1,2%o	152,207	137,303	PCM CR 417
1712	1/5 + 1,2%o	126,719	114,310	PCM CR 417
1713	1/5 + 1,2%o	173,086	156,137	PCM CR 417
1714	1/5 + 1,2%o	163,919	147,868	PCM CR 417
1715	1/5 + 1,2%o	140,920	127,121	PCM CR 417
1716	1/5 + 1,2%o	147,709	133,245	PCM CR 417
1717	1/5 + 1,2%o	220,249	198,682	PCM CR 417
1718	1/5 + 1,2%o	198,920	179,441	PCM CR 417
1719	1/5 + 1,2%o	177,914	160,492	PCM CR 417
1720	1/5 + 1,2%o	142,751	128,773	PCM CR 417
1721	1/5 + 1,2%o	141,359	127,517	PCM CR 417
1722	1/5 + 1,2%o	140,870	127,076	PCM CR 417
1723	1/5 + 1,2%o	132,556	119,576	PCM CR 417
1724	1/5 + 1,2%o	151,725	136,868	PCM CR 417
1725	1/5 + 1,2%o	137,706	124,222	PCM CR 417
1726	1/5 + 1,2%o	169,393	152,806	PCM CR 417
1727	1/5 + 1,2%o	176,746	159,439	PCM CR 417
1728	1/5 + 1,2%o	197,962	178,577	PCM CR 417
1729	1/5 + 1,2%o	222,479	200,693	PCM CR 417
1730	1/5 + 1,2%o	187,261	168,924	PCM CR 417
1731	1/5 + 1,2%o	181,171	163,430	PCM CR 417
1732	1/5 + 1,2%o	190,208	171,583	PCM CR 417
1733	1/5 + 1,2%o	188,129	169,707	PCM CR 417
1734	1/5 + 1,2%o	168,571	152,064	PCM CR 417
1735	1/5 + 1,2%o	167,668	151,250	PCM CR 417

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Table 2

Ratios of silver production to mercury arrivals in Potosí, in certain decades.

decade	mercury arriving (A) (to nearest *quintal*)	decade	silver produced (B) (to nearest mark)	$\frac{B}{A}$
1593–1602	47,031	1594–1603	7,822,735	166,3
1606–15	46,454	1607–16	6,939,731	149,4
1616–25	44,754	1617–26	5,919,297	132,3
1626–35	41,578	1627–36	5,840,350	140,5
1636–45	38,615	1637–46	5,428,107	140,6
1646–55	41,126	1647–56	4,848,540	117,8
1656–65	32,925	1657–66	3,952,984	120,1
1666–75	24,747	1667–76	3,546,100	143,3
1676–85	27,985	1677–86	3,650,246	130,4

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Table 3

Silver production in Potosí itself and in the remainder of the Potosí district, 1660–1720, in marks of 2380 *maravedís*.*

year	Potosí	district	total	district as percentage of total	source
1660	230,492	136,228	366,720	37,1	PCM CR 381 M5
1661	213,106	136,554	349,660	39,1	PCM CR 386 M5
1662	263,562	95,150	358,712	26,5	PCM CR 392 M5
1663	243,242	79,102	322,344	24,5	PCM CR 396 M5
1664	275,103	65,215	340,318	19,2	PCM CR 403 M5
1665	270,422	98,066	368,488	26,6	PCM CR 408 C
1666	305,458	74,368	379,826	19,6	PCM CR 410 M5
1667	330,725	67,734	398,459	17,0	PCM CR 413 M5
1668	345,560	42,945	388,505	11,1	PCM CR 417 B5
1669	311,736	39,084	350,820	11,1	PCM CR 424 M5
1670	261,841	49,907	311,748	16,0	PCM CR 417 B5
1671	273,091	105,199	378,290	27,8	PCM CR 431 C
1672	248,651	102,119	350,770	29,1	PCM CR 435 C
1673	320,027	60,407	380,434	15,9	PCM CR 437 C
1674	353,257	25,426	378,683	6,7	PCM CR 441 C
1675	318,059	1,116	319,175	0,3	PCM CR 445 C
1676	279,263	9,954	289,217	3,4	PCM CR 450 M5
1677	294,827	14,382	309,209	4,7	PCM CR 455 C
1678	286,229	80,859	367,088	22,0	PCM CR 460 C
1679	259,906	90,266	350,172	25,8	PCM CR 462 C
1680	249,217	104,493	353,710	29,5	PCM CR 463 C
1681	274,994	110,487	385,481	28,7	PCM CR 417 B5
1682	267,178	103,436	370,614	27,9	PCM CR 417 B5
1683	253,434	157,796	411,230	38,4	PCM CR 469 M5
1684	275,426	133,901	409,327	32,7	PCM CR 472 M5
1685	263,517	102,996	366,513	28,1	PCM CR 477 M5

Abbreviations attached to references from the archive of the *caja real* of Potosí, in the Casa de la Moneda:

B5 Libro manual borrador de ... quintos ...
C Libro real común del cargo y data ...
CD Libro real duplicado del común ...
M5 Libro real manual de las barras que se quintan en esta caja ...

* Production is derived from *quinto* and *derecho de Cobos* by the procedures used in Table 1. Small variations between the total production figures shown in Table 1 and Table 3 are caused by use of different sources. Figures are to the nearest mark.

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year	Potosí	district	total	district as percentage of total	source
1686	227,956	98,949	326,905	30,3	PCM CR 417 B5
1687	265,850	94,622	360,472	26,2	PCM CR 480 C
1688	263,307	97,900	361,207	27,1	PCM CR 483 CD
1689	263,809	97,197	361,006	26,9	PCM CR 485 C
1690	283,935	91,525	375,460	24,4	PCM CR 487 C
1691	255,657	75,577	331,234	22,8	PCM CR 491 C
1692	196,450	40,485	236,935	17,1	PCM CR 496 CD
1693	224,080	94,354	318,434	29,6	PCM CR 497 C
1694	206,813	98,268	305,081	32,2	PCM CR 504 C
1695	224,318	86,461	310,779	27,8	PCM CR 505 C
1696	178,619	100,823	279,442	36,1	PCM CR 417 B5
1697	181,792	81,318	263,110	30,9	PCM CR 508 C + 510 C
1698	202,120	40,398	242,518	16,7	PCM CR 510 C + 517 C
1699	190,734	51,531	242,265	21,3	PCM CR 417 B5
1700	212,617	13,570	226,187	6,0	PCM CR 524 C + 528 C
1701	164,491	24,367	188,858	12,9	PCM CR 417 B5
1702	177,663	30,091	207,754	14,5	PCM CR 536 M5
1703	163,540	37,334	200,874	18,6	PCM CR 417 B5
1704	167,507	18,637	186,144	10,0	PCM CR 544 M5
1705	135,652	42,436	178,088	23,8	PCM CR 551 M5
1706	188,230	9,568	197,798	4,8	PCM CR 417 B5
1707	186,937	16,336	203,273	8,0	PCM CR 417
1708	175,881	32,835	208,716	15,7	PCM CR 417
1709	147,356	38,997	186,353	20,9	PCM CR 417
1710	127,040	45,324	172,364	26,3	PCM CR 417
1711	117,590	19,712	137,302	14,4	PCM CR 417
1712	109,290	5,021	114,311	4,4	PCM CR 417
1713	147,417	8,721	156,138	5,6	PCM CR 417
1714	119,597	28,271	147,868	19,1	PCM CR 417
1715	107,425	19,695	127,120	15,5	PCM CR 417
1716	130,469	2,775	133,244	2,1	PCM CR 417
1717	no information		198,682	?	PCM CR 417
1718	157,721	21,720	179,441	12,1	PCM CR 417
1719	146,993	13,500	160,493	8,4	PCM CR 417
1720	114,320	14,452	128,772	11,2	PCM CR 417

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Table 4

Some totals of *quinto* and *derecho de Cobos* paid at the *caja real* of Oruro, and derived silver production, between 23 May 1607 and 30 April 1712.*

account period	total tax (*pesos ensayados* of 450 *maravedís*)	production (marks of 2380 *maravedís*)	source
23 May 1607–9 Mch 08	187,366	167,105	AGI Charcas 18
20 June 1609–29 Mch 12	613,595	547,245	AGI Ctd 1829 *ramo* 1
11 Mch 1611–3 Mch 12	230,721	205,772	OBP Libro real manual, 9 Mch 11–29 Mch 12
31 Mch 1612–16 Mch 15	648,520	578,392	AGI Ctd 1829 *ramo* 1
4 Ap 1613–20 Feb 14	202,007	180,163	AGI Charcas 19
22 Feb 1614–16 Mch 15	209,539	186,881	AGI Charcas 19
21 Mch 1615–28 Mch 16	292,505	260,875	AGI Ctd 1829 *ramo* 2
? Feb 1616–24 Feb 17	299,914	267,483	AGI Charcas 19
24 Feb 1617–10 Mch 18	336,223	299,866	AGI Charcas 19
17 Mch 1620–11 Mch 21	136,337	121,594	AGI Charcas 19
23 Aug 1621–30 Dec 21	55,759	49,730	AGI Ctd 1829 *ramo* 1
1624 all year	232,845	207,667	AGI Ctd 1829 *ramo* 3
1625 all year	164,809	146,988	AGI Ctd 1829 *ramo* 3
1626 all year	311,146	277,501	AGI Ctd 1829 *ramo* 3
1627 all year	263,774	235,251	AGI Ctd 1829 *ramo* 3
1628 all year	247,693	220,910	AGI Ctd 1829 *ramo* 3
1629 all year	238,454	212,669	AGI Ctd 1829 *ramo* 3
29 Mch 1631–18 June 32	232,059	206,966	AGI Ctd 1830
9 July 1632–14 May 33	172,379	153,739	AGI Ctd 1830
15 May 1633–31 Jan 36	466,735	416,265	AGI Ctd 1830
1 Feb 1636–14 July 40	713,699	636,524	AGI Ctd 1830
11 Mch 1637–10 Mch 38	166,452	148,452	OBP Libro del tesorero 1637
11 Mch 1638–10 Mch 39	148,027	132,020	OBP Libro del tesorero 1638

* The *derecho de Cobos* was charged in Oruro at a constant rate of 1,5%. Production figures are derived from tax yields by the procedure used in Table 1. All figures are given to the nearest whole number.
Scarcity and irregularity of accounts from the *caja real* of Oruro make it unfortunately inevitable that the account periods shown in this Table should be of varying length and starting date.

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account period	total tax (*pesos ensayados* of 450 *maravedís*)	production (marks of 2380 *maravedís*)	source
29 Nov 1639–10 Mch 40	51,117	45,590	AGI Ctt 4736
15 Mch 1640–20 Mch 41	183,842	163,962	OBP Libro del tesorero 1640–41
27 Mch 1641–31 Mch 42	187,831	167,520	AAGN sala 13, cuerpo 8, legajo 2. Manual de este año de 1641
1 Ap 1646–3 Ap 47	174,019	155,202	AGI Ctd 1831
4 Ap 1647–22 June 48	196,060	174,859	AGI Ctd 1831
23 June 1648–19 Dec 49	240,633	214,612	AGI Ctd 1831
5 Jan 1650–31 Jan 51	127,754	113,939	OBP Libro manual 1649–51
1 Feb 1651–6 Dec 51	51,003	45,488	AGI Ctd 1831
7 Dec 1651–30 Ap 53	94,005	83,840	AGI Ctd 1831
1 May 1653–31 May 54	55,328	49,345	AGI Ctd 1831
1 June 1654–31 Jan 55	30,634	27,321	AGI Ctd 1831
20 Ap 1656–31 Mch 57	48,378	43,147	OBP Libro del contador 1656
20 Mch 1660–24 Ap 61	19,700	17,570	OBP caja Oruro, vol. 09
		9.017	
21 May 1662–31 July 63	20,332	18,133	AGI Ctd 1833 *ramo* 2
1 Aug 1663–12 July 65	20,823	18,571	AAGN sala 13, cuerpo 8, legajo 2 + OBP Libro del contador 20 Dec 1663–12 July 65
1 June 1666–7 June 67	52,822	47,110	AGI Ctd 1832 *ramo* 1
7 June 1667–9 June 68	51,700	46,109	AGI Ctd 1832 *ramo* 2
3 Mch 1673–4 Jan 74	24,089	21,484	OBP Libro del contador 1673–74
7 Nov 1674–3 Nov 75	25,960	23,153	AAGN sala 13, cuerpo 8, legajo 2
29 Nov 1675–24 Nov 76	27,665	24,673	AAGN sala 13, cuerpo 8, legajo 2
3 June 1683–8 May 84	42,190	37,628	AGI Ctd 1832 *ramo* 3
8 May 1684–14 July 85	42,156	37,598	AGI Ctd 1832 *ramo* 3
16 July 1685–26 Ap 86	30,251	26,980	OBP Libro real tercero de copias de los libros originales . . .
26 Ap 1686–30 Ap 87	50,089	44,673	OBP Libro real tercero de copias de los libros originales . . .

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account period	total tax (*pesos ensayados* of 450 *maravedís*)	production (marks of 2380 *maravedís*)	source
30 Ap 1687–30 Ap 88	44,437	39,632	OBP Libro real tercero de copias de los libros originales . . .
30 Ap 1688–30 Ap 89	36,706	32,737	OBP Libro real tercero de copias de los libros originales . . .
30 Ap 1689–30 Ap 90	46,103	41,118	AGI Ctd 1832 *ramo* 3
30 Ap 1690–30 Ap 91	44,106	39,337	AGI Ctd 1832 *ramo* 4
30 Ap 1691–30 Ap 92	49,867	44,475	OBP caja Oruro, vol. $\frac{0}{9.017}$, f. 12v
30 Ap 1692–30 Ap 93	50,672	45,193	OBP caja Oruro, vol. $\frac{0}{9.017}$, f. 13v
30 Ap 1693–30 Ap 94	72,733	64,868	OBP caja Oruro, vol. $\frac{0}{9.017}$, f. 14v
30 Ap 1694–30 Ap 95	91,953	82,010	OBP caja Oruro, vol. $\frac{0}{9.017}$, f. 15v
30 Ap 1695–30 Ap 96	103,091	91,943	OBP caja Oruro, vol. $\frac{0}{9.017}$, f. 16v
19 June 1698–30 Ap 99	69,355	61,855	AAGN sala 13, cuerpo 8, legajo 2
30 Ap 1706–30 Ap 07	95,764	85,409	AGI Ctd 1832
30 Ap 1707–30 Ap 08	80,781	72,046	AGI Ctd 1832
30 Ap 1708–30 Ap 09	107,504	95,879	AGI Ctd 1832
30 Ap 1709–30 Ap 10	123,775	110,391	AGI Ctd 1832
30 Ap 1710–30 Ap 11	116,050	103,501	AGI Ctd 1832
30 Ap 1711–30 Ap 12	91,204	81,342	AGI Ctd 1832

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